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## MONEY AND PRICES—DISCUSSION

D. F. HOUSTON: The discussion of money and prices today reminds one very strongly of the discussion forty years ago. Now, as then, the opinion is that prices have risen; but now, as then, there is wide difference as to the explanation. Now, as then, a highly respectable body of economists attribute the rise mainly to the new gold; and now, as then, a number of economists attribute the rise to influences immediately affecting the cost of production of commodities in general, instancing such things as labor unions, monopolies, extravagance, the tariff, general prosperity, etc. When I first glanced at the abstract of Professor Laughlin's interesting paper my thoughts were turned to Cairnes's brilliant discussion. He says:

"But prices having risen, to what is the rise to be attributed? Here too, as I have said, there is a divergence of opinion. Amongst economists I think it is pretty well agreed that the advance is, at least in a large measure, due to the effects of the gold discoveries. But, on the other hand, there is, on the part of commercial writers, and in general of all who view the question from the standpoint of practical business, a strong disposition to ignore, or altogether to deny, the influence of this cause on determining the results. The enhanced scale of wages and prices is not disputed, but it is referred to such causes as 'the recent great development of trade', 'changes in supply and demand, or 'the effect of strikes'; and the facts seeming in each given instance to be traceable to one or more of such influences, the incident of an increased abundance of gold is regarded as something superfluous and irrelevant, and which need not be taken account of in seeking their explanation. Such a mode of argument, however, I do not hesitate to say, implies a fundamental misconception as to the nature of the problem to be solved. For to show that an advance of prices is connected with a development of trade, with changes in supply and demand, or with the action of strikes, is not to prove that it is *not* due to the gold discoveries. An increased supply of money does not, and cannot, act upon prices, or upon the value of the metal composing it, in any other way than by being made the instrument of trade, by affecting demand and supply, or by furnishing employers with the means and the motives for advancing the wages of their workmen; and, consequently, however clearly the advance may be traceable in each given case to an occurrence of this nature, the problem still lies open: nothing has been done towards determining the question whether the increased monetary supplies may not have been an indispensable condition to the realization of the advance."

He continues:

"I venture to lay down broadly this proposition, that, when an advance in the price of any of the great staples of industry becomes

definitive (monopoly apart), there are two, and only two, adequate explanations of the fact: either the cost of producing the article (understanding by cost, not the money outlay, but the real difficulties of production) has increased, or the cost of producing or obtaining money has diminished."

With full recognition of the fact that the question is complex and that causes have been at work affecting the cost of production of commodities tending to enhance their price, I should dissent from Professor Laughlin's conclusion that the main explanation lies in this direction, and should contend that the principal factor explaining the rise in price since 1896 has been the enormous increase in the supply of gold and in the devices that have been tremendously developed for facilitating exchange, operating to increase the efficiency of gold and therefore its power to affect price.

Professor Laughlin gives a summary of the production of gold by value for various periods from 1492 to 1905, which I give in part as follows:

1493-1850.....	\$3,150,000,000
1851-1895.....	5,641,000,000
1896-1905.....	2,900,000,000
1493-1895.....	8,800,000,000
1893-1905.....	11,700,000,000

Between 1905 and the end of 1909 alone the increase has been \$1,700,000,000, making a total of \$4,600,000,000 for the period 1896-1909—more than half the total production for the four hundred years from the discovery of America to 1895, an amount only a billion less than the total output of the new gold from 1851 to 1895.

Even if all the gold produced had been preserved, such an enormous addition in less than fifteen years would tend to create the presumption that prices would be strongly affected, even conceding a vast increase in the production of commodities and an increase in the difficulty of securing them. When we consider that much of the gold produced in the four hundred years down to 1895 was lost, that much of it has gone to backward countries, and that the stock of gold is materially less at any period than the production up to that date, the presumption that gold has been the principal factor in affecting price in the last fourteen years is considerably strengthened.

I recognize that the statistics of the stock of gold, as well as all the others that we deal with, are not exact. I imagine that the estimates of the stock of gold at any period are almost more unreliable than any others that we have to deal with, but I note them for what they are worth and I wish to compare the estimates of the stock of gold at certain dates, in the principal countries of the world, with the world's production of gold up to those dates:

	Stock	Production
1850.....	\$ 1,600,000,000	\$ 3,150,000,000
1895.....	4,100,000,000	8,800,000,000
1906.....	6,900,000,000	12,100,000,000
1909.....	7,015,000,000	13,400,000,000

If we assume that the stock of gold in the principal countries of the world in 1895 was 50 per cent greater than the estimate, or six billions of dollars, the total stock existing at that date would still be only a billion and a half more than the aggregate addition in the fourteen years following.

It is generally agreed that prices rose between 1850 and 1873, although the addition to the stock of gold in the leading Western nations was slight, except in the case of France, and here the phenomena were the addition of a considerable mass of gold and the expulsion of a large amount of silver to the East. The new gold had an effect principally psychological in this period, particularly in the United States where the anticipation was that large reserves of gold would be available and where additional stimulus was furnished to speculation and overtrading in all directions, leading to the collapse in 1857.

In the period from 1873 to 1879 prices declined in spite of the great increase in the production of gold, which aggregated about \$2,400,000,000 and resulted in an excess importation or retention of gold in the leading countries of approximately two billions of dollars, distributed fairly uniformly through the leading nations. This period was one of tremendous industrial activity, characterized by the opening up of vast regions of new and fertile lands, the completion of transportation facilities through a great part of these regions, and the effective use of numerous important inventions in agriculture and manufacturing, which had as their effect the production of a great increase in the quantities of commodities generally at a lower cost. The

period was further characterized, as all preceding periods had been, by chaotic financial systems, experimentation with them, and final settling down to a gold standard. Much of the new gold and of the silver was sent into new and backward, rapidly developing sections of the earth to furnish the very foundation of a currency system and to meet the demands for rapidly developing trade. The result was that the increase in money did not quite keep pace with the demand for it brought about by the readjustments of the financial systems of the world and by the rapidly expanding commerce.

Since 1896 conditions have changed. For the first time in the world's history, each of the leading nations has devised a much more rational and satisfactory monetary system. Some degree of order has been brought out of the chaos. Confidence has superseded distrust. The foundations were laid for these changes by the additions to the gold stock of the world by the large output of the mines during the last half of the nineteenth century. Industry has prospered, but no vast new regions of land have been opened up, such as were exploited up to the last decade of the nineteenth century; no such enormous development of internal improvements has been witnessed. Inventions have proceeded, but not with the rapidity or of such wide importance as during the period preceding 1895. I suppose it may be conceded that the factors tending to the lessening of the cost of production of commodities generally have not operated by any means so powerfully in the period under discussion. Conditions of production have become more stable, and in manufacturing the concentration of industry and the growth of large enterprises have been witnessed. There has been a vast increase in the output of commodities generally in the last fourteen years, ranging in many important items from 50 to 100 per cent or more, exceeding, perhaps, the growth of the preceding period of twenty years or more. But to account for an increase of price from the side of commodities in general, it would be necessary to furnish evidence of the efficient operation of causes leading to great increase in the cost of production of them; and, while I am prepared to admit that the decline in the cost of production of commodities was checked, and even that some increase in the cost has occurred, I have seen no evidence to convince me that the increase has been sufficient to explain the rise in the last fourteen years. Perhaps the most tenable position the opponents

could assume would be that the food products have not kept pace with the increase in the population and with the demand, but it is not clear that this difficulty has presented itself in sufficient degree, in this country particularly, to explain the increase of price. And, when we view the expansion of agricultural production in other parts of the world, the sufficiency of this explanation becomes still more doubtful. In the United States the production of leading crops, like corn, wheat, and oats, has increased nearly as rapidly in the last fourteen years as in the preceding period of equal length, and the yield per acre has not decreased.

In the period under discussion the nations which have added most largely to their stock of new gold are the United States, France, Germany, the United Kingdom, India, and the Argentine Republic. Of those for which we have much data the United States, France, Germany, and England have made the most significant additions; of these four the United States and Germany have at the same time most satisfactorily developed credit devices for increasing the efficiency of gold; and, while I believe it is conceded that prices have reached a higher level in the United States than in any of the other countries, I imagine that it may be found that there has been a slightly higher rise in Germany than in either England or France.

The situation in the United States presents unusual interest. Up to 1866 the net result of importations and exportations of gold and silver combined and of the retention of the gold and silver produced within the country itself was an addition of only \$238,000,000; between 1866 and 1876 the net result was the addition of less than eighty millions of gold and ninety millions of silver; between 1876 and 1886,—the period representing the resumption of specie payments,—something like a half billion dollars were added; but in the following ten years less than one hundred and fifty millions resulted from these forces. The Director of the Mint gives his estimate of the stock of gold in the United States in 1895 as \$502,000,000. The estimate for 1909 is \$1,612,000,000. More than twice as much gold has been added to the stock of the United States in the last fourteen years than was added in the preceding fifty, and the amount of money of all kinds has increased in the period from 1906-1909 from \$1,500,000,000, to \$3,100,000,000. The lawful money reserve has increased from \$420,000,000 to \$860,000,000, and the cash

holdings from \$875,000,000 to \$1,370,000,000; and, what is equally striking, the amount of individual deposits subject to check has increased from \$2,600,000 to nearly \$7,000,000,000. I am convinced that these enormous additions and developments, on the top of a somewhat adequate currency system in 1895, furnish the principal explanation of the rise in price.

That the tariff has played a part in the situation, I should of course not deny. By preventing us from securing supplies where they can be more economically produced, and by making it possible for domestic manufacturers to monopolize the market, and by tending to compel the payment for exports in gold, it has unquestionably played a part and is a notable factor. I imagine that for a part of the period under discussion the conditions which would make McDuffy's export tax theory applicable have been satisfied. In considering the tariff as a factor, however, we must not forget that we have had the tariff since the beginning, and that the rates have been nearly as high since the Civil War as they are today; and we must remember, further, that in one of the great countries which has no protective tariff the tendency of price has been upward; furthermore, we must not overlook the fact that many of the tariff rates, which are very high now, are not effective or not nearly so effective as they were in the earlier period, and also that its influence is probably greater in things in which the rise of price has been less marked.

I should not deny that labor unions and monopolies have had an influence in increasing price. The evidence seems to justify the conclusion that monopolies have had some effect in increasing price. I am not sure that there is sufficient evidence in regard to labor unions to enable us to form a conclusion. That labor, as well as capital, has been unwise, I should concede. Many of the policies of the labor unions are unquestionably detrimental to their own welfare and to that of the community,—if pursued they would be economically suicidal; that many of their other policies are wholesome and will result in economic gain, I think is equally clear; what the balance is, is uncertain. It is probably clear that strikes have not operated any more strongly in the later period than in the former.

Much has been said in discussion about the influence of extravagance. This has played a part in similar discussions at all times; every era has its cry of extravagance, and it is not clear that it has been more marked in our time than in former times.

And one thing is quite clear, that the extravagance, or economic waste, resulting from the prosecution of war and its after effects, has been conspicuously absent during the last fifteen years.

To summarize. The stock of gold in the leading western commercial nations, with which we are concerned in discussing prices, probably did not exceed \$5,000,000 at the end of 1895. During the next fourteen years there was added to the stock of gold of these countries an amount nearly equal to the existing stock. In addition, a number of these countries enormously developed their credit devices. According to all economic law, these facts create a strong presumption that gold has been the main factor affecting price. No sufficient evidence has been presented to overthrow this presumption. If, under existing conditions, gold is not the principal factor in producing a rise of price, I cannot easily imagine conditions under which it could reasonably be assigned as a controlling cause.

E. W. KEMMERER: An adequate discussion of the papers presented by Professors Fisher and Laughlin would require much more time than the few minutes at my disposal. I shall accordingly limit myself to a few points and support my conclusions principally by footnote references. This procedure is perhaps the more justifiable in view of the fact that my own philosophy of the relationship between money and prices is given in detail in the book<sup>1</sup> on money and prices to which Professor Fisher has so generously referred.

I have had the opportunity of reading in manuscript Professor Fisher's forthcoming book on *Price Levels*, of which his paper today represents one chapter, and find myself in substantial agreement with his main contentions. His discussion is a permanent contribution to monetary science of very great value. To a number of minor points, however, it seems to me, exception must be taken. For example, I doubt if the percentage of the country's exchange work performed by means of cash is as large as he estimates (p. 43), that is, about 86 per cent in 1896 and about 91 per cent in 1909, and believe that he has not made sufficient allowance for the tendency of figures based upon bank returns to exaggerate the relative importance of checks.<sup>2</sup>

<sup>1</sup> *Money and Credit Instruments in their Relation to General Prices*, 2d edition, 1909. New York: Henry Holt & Company.

<sup>2</sup> *Ibid.*, p. 107.

Professor Fisher's formula expressing the relationship between the circulating media and prices is essentially the same as my own,<sup>3</sup> but he pays little attention to the factor of business confidence, which is a most important consideration in the interpretation of the formula. The ratio of deposit currency to bank reserves is a function of business confidence.<sup>4</sup>

The distinction Professor Fisher draws between the prices of individual commodities and the general price level appears to me, as to Professor Laughlin, to be untenable. It is, moreover, contradictory to his general philosophy of money. His index numbers recognize no general price level distinct from individual prices. He illustrates the point that the price of any individual commodity presupposes a general price level by saying that "the position of a particular wave in the ocean depends on the general level of the ocean." I can conceive of no such distinction between the general price level and individual prices as his statements seem to imply. General prices "are but a combination, or composite photograph, as it were, of individual prices."<sup>5</sup> Professor Fisher's illustration of the ocean would be more apposite if he called it a lake whose level was continually changing, and if he considered each particular wave as extending to the bottom.

Passing to Professor Laughlin's paper, which has been presented to me merely in the form of an abstract, we find ten propositions, which to a considerable extent are repetitious. His first five propositions are rather commonplace generalizations and few economists will be disposed to dissent from their essential soundness. They place him much closer to the quantity theory of money than most of us, judging him from his previous writings, were disposed to think he would go; and in his third proposition he says, "Probably there is not so much difference of mind regarding the theory of prices as is sometimes supposed."

In passing over these first five propositions it may be well to note an important qualification to his statement that "The price of a commodity is the quantity of a given standard for which it will exchange." If by standard he means standard money (in the economic sense of the term as contrasted with the legal sense) the definition is essentially true; if, however, he means the bullion from which the standard money is made, the definition is not

<sup>3</sup> Kemmerer, *Money and Credit Instruments*, pp. 9-18, 74-82.

<sup>4</sup> *Ibid.*, pp. 82-8, 121-6, 145-8.

<sup>5</sup> *Ibid.*, p. 9.

entirely true. For there is always a certain discrepancy between the bullion value of a coin and its money value even under a free coinage system, arising from such obstacles to the free flow of bullion into money and of money into bullion as brassage charges, delays in coinage, expenses of getting bullion to and from the mints, abrasion of coin, legal restrictions on melting, and the like. Occasionally such obstacles have caused a very great difference between the bullion value of a coin and the money value, as, for example, at the time of the Australian gold discoveries, where, owing to the delays involved in sending bullion to London for coinage, gold in Australia sold in the form of bullion as low as 60 shillings, 50 shillings, and in some instances 40 shillings per ounce, although an ounce of gold would coin into 77s. 10½d.<sup>6</sup> Whenever there is such a difference, price is an expression of the value of money and not of the standard, if by standard is meant the number of grains of gold in the monetary unit, as, for example, 23.22 grains in the United States dollar.

With reference to Professor Laughlin's fourth proposition it may be said that no economist of standing claims that purchasing power is "identical with the quantity of the media of exchange in circulation." Effective purchasing power, however, in our modern business communities, does depend upon the possession of money or of the right to demand money. The amount of deposit currency which can be used at any time in purchasing goods is limited by bank reserves because commercial deposits are payable in money on demand at the order of the depositor. Other assets, no matter how good, cannot be used for the purpose of meeting deposit obligations, except when the entire credit machinery breaks down and suspension is resorted to under the euphemistic name of clearing house loan certificates.

Professor Laughlin's sixth and seventh points are essentially the same and may be considered together. He says:

".....Price-making generally precedes the demand upon the media of exchange, and does not at all imply any necessary demand at the moment upon the standard in which the prices are expressed.....The offer of money for goods is only a resultant of price-making forces previously at work, and does not measure the demand for goods....That is, the quantity of the actual media of exchange thus brought into use is a result and not a cause of the price-making process....."

<sup>6</sup>Cairnes's *Essays*, p. 25. See also Kemmerer, p. 39, note; pp. 57-9.

This contention appears to me to result from a superficial view of the price-making process. The offer of money for goods and the offer of goods for money are of course not the first steps. Each person has his own individual or subjective prices on all sorts of commodities; these subjective prices represent the valuations which he places upon the respective commodities in terms of the valuation which he places upon the money unit. The more of a particular commodity he has the lower his subjective valuation of a unit of that commodity; the more money he owns the lower his estimation of a dollar and the higher his subjective prices; and *vice versa*. Through a process of competition, selection, and adaptation, some of these subjective prices develop into market prices, that is, prices at which both buyer and seller benefit, and at which therefore an exchange takes place. To paraphrase an old adage, the proof of the market price is in the exchange. It is a common observation that stock quotations to be of much value must show the number of sales effected at the prices quoted. A stock for which the maximum bids were 100 and the minimum offers were 110, would not possess a market price in the strict sense of the word. The fact that sales have recently been made at a certain price, or are now being so made, is of course presumptive evidence that intending purchasers can buy at about that price. A market price, however, is the amount of money paid for a commodity, not the amount asked, offered, or promised.

Professor Laughlin's ninth proposition I find very difficult to follow. His premise that reserves are "a consequence of the loan operations" is a dangerous half truth; they are also a consequence of most other kinds of banking operations, cash deposits, cash withdrawals and clearing house balances, foreign and domestic exchange operations, etc. His other premise, that "the fact of an increased supply of gold does not of *itself* [the italics are mine] increase loans, unless the bank possesses the control of the capital which is a condition precedent to the loans," contains an element of truth, but is misleading. While an increased supply of gold does not of itself increase loans it normally has that result; and the bank's discount rate and the condition of its reserve are powerful factors in influencing its loan account. His premises, I believe, are not sound, and his conclusion, namely, that "the expansion of business is not a direct consequence of an increasing supply of gold, any more than an expansion of railway traffic is the direct consequence of an increasing supply of

cars," would not follow from his premises, even if they were sound. The normal causal chain is more nearly this: increased gold production results in greatly increased amounts of gold coming into the monetary uses.<sup>7</sup> This gold comes into the hands of individuals and is to a large extent deposited in banks; increased money incomes on the part of individuals lower their estimations of the value of the money unit, raise subjective prices, and as a consequence market prices; larger money deposits in banks result in larger reserves, banks do not make interest on money held in reserves, and accordingly take measures to invest such surplus money, keeping these reserves as low as is consistent with law and their ideas of safety;<sup>8</sup> inducements to borrowers are made in the form of more favorable discount rates; collateral is not scrutinized so carefully; the speculative market is stimulated by increasing supplies of call money; confidence everywhere increases; new enterprises spring up and old ones are expanded; and in a short time the new gold is absorbed by a higher price level and an overstimulated business activity. This was the situation after the Californian and Australian gold discoveries of the last century and it has been the result of the greatly increased gold production of the last few years.

Professor Laughlin's final point is that since 1895 the new demand for gold has roughly equaled the new supply, and that the changes in prices since 1896 must be sought mainly in the "other things", which have not remained equal. In support of this conclusion he offers two principal arguments. The first is as follows:

"... Because of the large existing stock of gold, very considerable changes may take place in the supply of gold without materially changing the world value of gold as related to goods in general. Rapid changes of price are hence more likely to be due to influences in the market for goods, to speculative changes of demand for goods, or to psychological forces working independently of facts. . . ."

In reply it may be said that the production of gold since 1895 represents a very large percentage of the total supply. The Soetbeer figures as supplemented by those of the Director of the

<sup>7</sup>The value of gold bullion deposited at the United States mints and assay offices increased from \$87,924,000 for 1897 to \$205,036,000 for 1907. Figures furnished by the Director of the Mint.

<sup>8</sup>It is noteworthy that the reserves of the New York associated banks, for example, are usually kept very close to the legal reserve requirements. Cf. Sprague, *Crises under the National Banking System*, p. 222.

Mint show that the world's gold production for the 405 years 1492-1896 inclusive was in round numbers \$8,982,000,000,<sup>9</sup> and that for the eleven years 1897-1907, was \$3,513,000,000; in other words, for these eleven years it was over 39 per cent of the total for the preceding 405 years. Probably the effective supply represents a much larger proportion of recent gold because of (1) the large amount of loss chiefly by abrasion of the gold produced in the earlier years, and of (2) the greater degree to which this early gold has assumed specialized forms, such as jewelry, plate, etc.

Satisfactory index numbers of prices for recent years are not available for all the principal countries of the world. Such as we have, however, point to a decided rise of prices in all gold standard countries since about 1897. Comparing standard price index numbers in six of the chief countries of the world for the years 1897 and 1907, we find the general price level to have risen as follows:<sup>10</sup>

United States—Bureau of Labor figures.....	44.4%
Canada—Coats figures, (weighted).....	43.7%
England—Sauerbeck figures .....	29.0%
France—de Foville, figures for export prices <sup>11</sup> .....	13.3%
Germany—Hamburgh figures .....	30.8%
Italy—Necco figures for export prices.....	23.4%

If we average these figures together, assigning the same importance to the figures of each country, in order to get a *rough* idea of the movement of world prices in gold standard countries during the eleven years in question, we find that the average increase was 30.8 per cent. If we follow Professor Laughlin and compare the years 1895 and 1907, we find the average increase in prices to have been 25.8 per cent, and the world's gold production for the 13 years 1895 to 1907 to have been about 42 per cent of that for the preceding 404 years. When to this is added the fact that the evidence points to a smaller percentage of the world's annual gold production going into the industrial

<sup>9</sup> Gold produced before 1492 represents an insignificant part of the existing supply.

<sup>10</sup> Useful tables summarizing all of these index numbers, except those of Canada, are given by Achille Necco, in his article on *La curva dei prezzi delle merci in Italia negli anni 1881-1909*, in *La Riforma Sociale*, Sept.-Oct., 1910.

<sup>11</sup> Comparison is for 1897 and 1906, figures for 1907 not being available.

uses than formerly, and the further fact that during the period in question the increase and improvements in the world's banking facilities have greatly economized the uses of money, we see that a very substantial increase in general prices would be expected, despite a great expansion of business. World prices in fact have not increased nearly as rapidly as the flow of gold into monetary uses since 1897, not to mention the enormous development of deposit currency. The Director of the Mint estimates each year the amount of the world's new gold used in the industrial arts. Computations I have made based upon these figures show a tendency for a decreasing percentage of the annual production to be used in the arts, although there is considerable irregularity. For the seven years 1895-1901 the average percentage was 27.1, and for the seven years 1902-1908 it was 25.3.<sup>12</sup>

Professor Laughlin's second argument in favor of the proposition that the recent rise in prices has not been due primarily to the increased gold production is one of the most beautiful examples of begging the question that I have seen in economic literature. He says:

"In recent discussions one of the 'other' factors which has been slighted is the demand for gold since 1895. The examination shows that the new demand in countries turning to the gold standard, and in those already using gold and extending their demand, amounts in round numbers to about \$3,000,000,000. Hence the new demand has roughly equaled the new supply, since 1895,—a fact which jumps with the known conditions in the great financial markets like London, where new arrivals of gold are eagerly competed for by European banks."

Of course the demand for gold equals the supply, as does the demand for wheat or any other commodity, when one interprets demand and supply as one should, in terms of market prices. The general price level is the very thing which equilibrates the demand for gold and the supply. The higher price level about which we are talking is an expression of the absorption of most of this new gold into the world's circulation. Banks and merchants eagerly compete for it, because higher prices require more money to do a given amount of exchange work, and rising prices stimulate business.

<sup>12</sup> De Launay thinks that the industrial consumption averages somewhere between 40 and 50% of the annual output, but believes that for several years past the industrial uses have been absorbing a decreasing proportion, though an increasing amount. (*The World's Gold*, pp. 176-7.)

JOSEPH FRENCH JOHNSON: I am glad to observe that there appears to be a tendency toward agreement with regard to the fact that the value of money depends upon the demand for it and supply of it. Professor Laughlin likes the word *standard* better than I do. It suggests something permanent and fixed, whereas money is a very changeable thing. While I am in agreement with Professor Laughlin in the conclusion that the general level of prices depends upon the demand for and supply of money, I am unable to give assent to many of the propositions which he puts forward as links in the chain of reasoning leading to that conclusion.

For example, Professor Laughlin says, "A change of prices may be due to changes in the demand for and supply of (thus including the expenses of production) goods as well as to changes in the demand for and supply of gold." This proposition is true with regard to changes in the prices of particular commodities. The price of wheat may rise or fall as a result of a change in the demand for or in the supply of wheat. The proposition, however, is not true with regard to a change in the general level of prices. An increase in the supply of goods will lower the level of prices for the simple reason that it will increase the demand for gold. I am not certain that I have understood Professor Laughlin's exposition of his theory, but he certainly seemed to me to argue that there could be a change in the general level of prices without any change whatever in the demand for or supply of gold. Such a position, it seems to me, is absolutely untenable.

That Professor Laughlin seeks to hold this untenable position, it seems to me, is made evident by the qualification with which he accepts the statement that a change in the quantity of money, other things being equal, would be a factor affecting prices. He says, "An increasing demand for gold, however, would work against the effect of an increasing supply. If the new demand offset the new supply, then, if changes of price occurred, their cause must be sought in the influences touching the producing and marketing of goods." The second conditional clause in that last sentence introduces an impossible supposition, for if a new supply of gold is offset by a new demand for it, there could be no change in the general level of prices, so that no cause for any change would have to be sought in the "influences touching the producing and marketing of goods." Professor Laughlin appears to have in mind forces affecting the general level of prices which are en-

tirely hidden from my sight. A change in the level of prices means a change in the value of gold, and how can there be a change in that if the new demand for gold just offsets the new supply?

Professor Laughlin's analysis of the price-making process is incomplete and misleading. He is correct when he says that the causes of price changes must be sought in the forces settling particular prices, but he is manifestly wrong when he states that the price of wheat is "arrived at by the higgling of the market, which depends on the buyers' and sellers' judgment of the demand for and supply of wheat." Such higgling would determine only the value of wheat. The price of wheat is not fixed until buyer and seller have reached an agreement in their estimates as to the value not only of wheat, but also of money. If wheat is comparatively easy to get, the price falls. If money is easier to get, the price rises. The demand for and supply of money is evidently just as important in the determination of the price of wheat as is the demand for and supply of wheat itself. When Professor Laughlin says that the offer of money for goods is only a resultant of price-making forces previously at work, he must have in mind some price-making process and price-making forces of which I have never heard. I know of no market in which goods are lowered in price except for the reason that at the higher price not enough money is offered to absorb the supply; nor of any market in which goods are raised in price except for the reason that buyers are willing to offer more money for the goods.

In his analysis of credit and its relation to the value of money, Professor Laughlin seems to me to have in mind a hypothetical financial world, the like of which does not and could not exist on earth. He strives to show that a bank's ability to make loans depends upon the amount of its capital and deposits, and that therefore any increase in the supply of gold would not in itself lead to an increase of loans. "Expansion of business", he remarks, "is not a direct consequence of an increasing supply of gold any more than an expansion of railway traffic is the direct consequence of an increasing supply of cars." He is quite right if he means that an increase in the amount of gold will not necessarily cause the exchange of more goods. But this does not appear to be his meaning. He holds that the use of new gold in bank reserves cannot be a causal force raising prices, for the bankers cannot increase their loans, in his opinion, unless the

condition of business demands such an increase. In his hypothetical financial world bankers are willing to carry idle stocks of gold and to wait until business conditions make necessary an increase in their loans. In the real financial world, of course, bankers do nothing of the sort. Bankers with surplus gold immediately tempt borrowers by lowering the rate of discount and thus increasing the money demand for goods in the markets. As a result there is an irregular and general rise of prices. More goods may not be bought and sold and there may be no expansion of business, but expressed in terms of money the totals are bigger. There is no analogy between dollars and freight cars. The carrying capacity of a car is fixed and unchangeable, but the carrying capacity of a dollar is elastic—so elastic, in fact, that dollars are always fully loaded no matter how small the supply of goods. As Professor Laughlin points out, although he apparently does not see its significance, the new demand for gold since 1895 has “roughly equaled the new supply.” Surely it could not have been otherwise, and no statistics are necessary to prove the fact.

MURRAY S. WILDMAN: My comments on these interesting papers will be directed upon the methods employed, and certain assumptions involved, in the arguments of both. Granting that Professor Fisher's analysis shows a perfect correspondence between the course of prices on the one hand and the quantity of money and credit instruments on the other hand, I am still unable to see which magnitudes are properly to be regarded as causes and which as effects. That variations in the value of gold and in the price level must be reciprocal, all will admit. If we regard  $M$  as denoting the gold supply for the present, a causal relation between  $M$  and  $P$  cannot be denied. But may it not be possible that variations in  $M'$ , or credit, and  $V$  and  $V'$ , the velocity of circulation of both money and credit, be simply in consequence of the variation in  $M$  and  $P$ ? Why is  $P$  the only passive term or why is it passive at all?

Suppose that the problem set was to discover the cause of credit expansion from 1896 to 1910. Would we not seek at once to explain it by reference to rising prices and greater volume of goods, making a broader basis for credit, while along with that is a greater gold supply which promotes the convertibility of an extended credit? Then might we not invoke Professor Fisher's algebraic formula, with terms rearranged, and show by this method of reasoning, supported by statistical verification, that the high

prices afford an adequate cause for the present expansion of credit?

But we are seeking the cause or causes of rise in the price level. This is equivalent to seeking the cause of decline in the value of gold. Does the "quantity theory" as newly expounded give us the solution? I think not. Rather it shows us that as gold has grown in supply, and fallen in value, credit has grown in magnitude and in rapidity of circulation, and that these changes in values and volumes have gone hand in hand with proportional changes in the price level and in the magnitude of commodity exchanges.

This view of the case brings me to substantial approval of Professor Laughlin's method of analysis and argument. That is, we must seek the facts regarding supply and demand as applied to gold, and those which bear upon supply and demand as touching goods, in so far as the demand for goods is expressed in offers of gold and gold representatives. Here the algebraic formula would be invoked to support his reasoning since  $M'$  and  $V$  and  $V'$  may be regarded as factors in the demand for gold.

To accept Professor Laughlin's method does not involve the necessity of his conclusions. The terms, by this method, do not lend themselves to exact mathematical statement and statistical proof, so conclusions cannot be exact and definite. This may be illustrated in a consideration of demand for gold. Some say that demand has grown step by step with supply and therefore gold has not been cheapened. Others say that supply has grown more rapidly than demand, and so gold has been cheapened and to that extent prices are raised.

Either statement may be wrong. I do not believe we have yet any reliable data regarding the demand for gold in the sense of a value-making factor. Most efforts to measure demand are based on statistics of gold in use. If one can show that consumption of gold in the arts, in the circulation, and in greater bank reserves, has increased *pari passu* with production, we are told that the value of gold has not been lowered by the greater supply.

But statistics of consumption give no clue to demand in the value-determining sense. We have many staple commodities, such as wheat and cotton, whose price drops sharply when the supply exceeds a certain normal volume, even though the whole crop is consumed. Statistically speaking, the demand for a cotton crop always rises as supply rises, and falls as supply falls, but that is because demand and supply become equated through a variation

in price. Demand, in this sense of quantity demanded, is in part a result rather than a cause of value.

When we can properly speak of demand as potent for the determination of value, we are thinking of demand from the point of view of *intensity* rather than the point of view of *magnitude*. But the demand which makes for value—demand intensively considered—is only measured by the purchasing power offered. Applied to gold, I know of no measure of demand except in the goods and services offered in exchange. To say that goods and services offered for an ounce of gold in 1910 are less than are offered for an ounce of gold in 1896, is simply to say that prices are higher. But it is these prices that we are trying to explain by giving the effect for the cause, when we say that demand has risen with supply.

Those staple commodities whose value falls off abruptly with any increase of supply beyond a customary stock are said to be subject to an inelastic demand, and those whose value declines uniformly with excessive supplies are said to have an elastic demand. Is the demand for gold elastic, or is it inelastic? And is it possible by independent analysis to construct the curve of elasticity which properly belongs to gold, and so avoid circular reasoning from the very prices we are trying to explain?

If the demand for gold is inelastic and the demand curve drops off abruptly after a certain supply is in evidence, the presumption is that in the conditions of gold production, rather than in the conditions of commodity production, lies the cause of our high prices. Moreover, if this be the case, we can readily see the cause of cheapening of gold, even though the product of a single year bears a small proportion to the existing stock.

If on the other hand the demand for gold be very elastic, so that it expands with growing supplies with no substantial alterations in value, then we are driven to seek the cause of high prices in influences directly touching the goods and services rather than in those directly affecting gold.

It would seem therefore that both methods of treatment have left something to be desired. The algebraic analysis, even as verified, presents the relations between magnitudes without showing the cause of high prices. The argument directed immediately at the value of gold of necessity involves consideration of the demand for gold, which, as a price-making factor, remains an unknown quantity.

T. N. CARVER: Professor Fisher's very elaborate and ingenious inductive method has demonstrated beyond all question the accuracy of his formula. The question remains, however, whether his formula supports his own conclusion or Professor Laughlin's. If, for example, it should be found that  $P$  is the cause of  $M$ , the formula would to that extent support Professor Laughlin's position. I believe that to a certain extent  $P$  is actually the cause of  $M$ . If the growing scarcity of agricultural land, or the increase in population and the increased demand for agricultural products without an increase in land, should increase the marginal cost of producing agricultural products to supply this larger demand, that would tend to increase the exchange value of these products, even according to the formula of Cairnes as quoted by President Houston. Even without any increase in the gold supply, this would cause each unit of product to exchange for a little more gold; then, in order that a given number of exchanges in agricultural products could be carried on, it would be necessary to have a larger number of ounces of gold, or a larger number of gold coins, or some other form of money of given denominations to do the money work. This, in other words, would necessitate a larger supply of money; and, if other forms than gold were not forthcoming, it would necessitate that a larger proportion of the stock of gold should be coined into money in order to do the work. Thus, without any increase whatever in the world's total gold supply, there would come to be an increase in the proportion of that supply used as money, or in the amount of gold coin actually used in circulation. I believe that this has taken place, and that it is one of the factors in the problem, although there has also been a very large increase in the gold supply to still further accentuate the tendency.

F. W. TAUSSIG: I congratulate Professor Fisher on his admirable paper. I am in accord with him in his method of reasoning and in all his essential results. His investigation of this subject adds another to the brilliant studies with which he has enriched economic science.

It deserves to be said, perhaps, that the term  $M'$  (deposits) in his equation is not entirely independent, but is in some degree a function of  $T$ . I say to some degree; it is dependent on  $T$  in part only, and not for very long periods. Professor Fisher has here treated it as dependent simply on  $M$ ; or rather not on  $M$  as defined

for his equation (money in circulation), but on another  $M$ —the money held in bank reserves. He has indicated the qualifications, which must be attached to this dependence of deposits on bank reserves. He has pointed out that though a general dependence appears over long periods of time, it is affected by changes in banking ways, and by the tendency to build up a higher superstructure of deposits in times of active business. But there is also a connection between  $T$ , volume of trade, and  $M'$ . That is, for short periods—nay, for periods of some years—an increasing volume of trade tends of itself to bring about an increasing volume of deposits. (I may say, parenthetically, that “volume of trade” does not seem to me an apt expression; “units of commodities”, the other phrase used by Professor Fisher, is better.) Though I would by no means go the length of Professor Laughlin’s reasoning, which seems to imply that every act of exchange supplies automatically its own medium of exchange, it does seem to me that our modern mechanism of deposit banking supplies an elastic source of deposits, which, for considerable periods, enables them to run *pari passu* with the transactions and loans resting on them. In the end, an increase of deposits finds its limit in the volume of cash held by the banks. But there is some elasticity of adjustment, by which loans and deposits increase as fast as transactions or faster; and this accounts in no small degree for the rise in prices during periods of activity. The phenomenon shows itself most strikingly in stock exchange loans, especially in a center like New York. There the business creates for itself quasi-automatically its own medium of exchange. I suspect it is undue generalization from operations of this sort that has led Professor Laughlin to take his extreme position—a position which I can not but think untenable. Some allowance for the temporary interaction between  $M'$  and  $T$  is necessary for the completeness of Professor Fisher’s reasoning.

RALPH H. HESS: Professor Fisher’s formula ( $MV + M'V = PT$ ) approximately expresses the mathematical equality of purchase and payment which cannot be questioned. I say *approximately* because  $M'$  (defined by Professor Fisher as “bank deposits subject to check”), if it be made to express an accurate measure of circulating credit, should include not only open bank accounts, but certain other values which constitute *current means of payment*, such as bankers’ bills, trade bills, cashiers’ checks, and cer-

tified checks. In other words, if  $M$  and  $M'$  are taken to represent, respectively, the value of authorized money in circulation and the value of circulating credit other than money, and if  $V$  and  $V'$  represent the respective rates of turnover of  $M$  and  $M'$ , the "equation of exchange" is obviously a mathematical identity. But this equation of values does not demonstrate or even imply any causal or quantitative relation between any two of its separate terms or factors, such as  $M$  and  $P$  or  $MV$  and  $PT$ . It does imply, however, that  $MV$  and  $M'V'$  and, indeed,  $M$  and  $M'$  are mutually compensatory. This being true, variations in  $PT$ , or in either  $P$  or  $T$ , or in either of the two factors of  $T$  (volume of trade), *e. g.*, *materials of trade* and their *frequency of turnover*, may be equalized by coincident variations in either term of the left-hand side of the equation. Likewise,  $PT$  may remain constant while  $MV$  and  $M'V'$  are subject to inverse variation, even to the extent of the elimination of the one or the other. Under conditions of primitive exchange,  $M'V'$  actually is eliminated; and it is possible to conceive of a development of credit and funding institutions by which  $MV$  might be made to closely approach zero.

The relation which Professor Taussig has pointed out between  $M'$  and  $T$  (the *value of negotiable credit* and the contemporary *volume of trade*) is not only possible, but, in any community of modernized commerce, is actual. Moreover, a knowledge of the process by which commerce is financed by the existing mechanism of discount, loan, deposit, and draft justifies the conclusion that, if the volume of trade ( $T$ ) be resolved into its factors, namely, *materials of trade* and their *frequency of exchange*, the latter factor of  $T$  is quite commensurate with the velocity of credit ( $V'$ ).

To me it seems incontestable that the volume and velocity of credit currency, as represented by bank deposits and other circulating media, vary directly as the volume and value of the materials of trade in the process of exchange, and are, mathematically speaking, dependent functions thereof. Granting this relation, an analysis of the equation of exchange establishes  $PT$  as the major determinant of  $M'V'$ , and, in so far as paper money may be authorized and issued upon the security of commercial assets, of  $M$ . That part of the money in circulation which does not derive its circulating powers from actual and potential commercial values is itself material of barter incorporating so-called intrinsic values.

The conclusion is clear that  $P$  (price) is independent of all other terms and factors of Professor Fisher's equation, that  $V$  and  $V'$

are determined by the mechanical circumstances and organization of exchange, and that the value of  $M$  and  $M'$ , taken collectively, is a spontaneous derivative of  $PT$ . The fundamental determinants of prices and of "price levels", therefore, are to be found outside of monetary and credit agencies *per se*.

As to the nature and order of the price-making process and the actual forces behind price movements, I am in substantial accord with Professor Laughlin. That prices, individually and collectively considered, express the value-proportion of demand for and supply of goods on the market to demand for and "visible supply" of the standard commodity is fundamentally logical. Nor is there occasion to quibble over the paradox of disturbed equilibrium of demand and supply. Physically considered, the goods which objectify these terms are, of course, identical; but, in the valuation process, demand and supply denominate, respectively, *desire* and *utility*—the generally acknowledged antecedents of value. Price is the equalizing factor between the effective demand for gold and the effective demand for other goods, each taken in conventional units; and price changes are resultants of, and commensurate with, net variations in the value-factors of the standard and of the objects of exchange.

Referring to the nature of credit and the economic qualities of credit instruments, the somewhat figurative expression "goods coined into a means of payment" is a striking and accurate characterization. It is possible that all legitimate market values, under normal trade conditions, may be liquidized through credit agencies, and the goods in which they are incorporated be thus rendered immediately and conveniently exchangeable. This process may be consummated independently of prices and with slight regard to the actual supply of money. The truth of this assertion is, in fact, demonstrated daily in the marts of trade.

J. LAURENCE LAUGHLIN: There is time to answer briefly only a few of the points raised by several speakers. First, Professor Fisher's equation of  $M V + M' V' = PT$  is to my mind not a solution, but only a statement, of the problem of price levels. It can be read backward as well as forward. For instance, it does not follow that the level of prices ( $P$ ) will rise with an increase of  $M'$ , since—as Professor Taussig has pointed out already—an active development of trade and industry ( $T$ ) would itself be a reason for an increase of banking loans and deposits

subject to check ( $M'$ ), thus equalizing effects on both sides of the equation without necessarily increasing  $P$ . This result is, in fact, one of the points on which I have steadily insisted in my own exposition of the theory of prices and credit; and Professor Fisher's equation allows it to appear distinctly. His equation does not show causes; it states a static situation, into which various causes may be read. The facts between 1876 and 1896 disclose an increase of bank deposits of 500 or 600 per cent, and yet that period was distinguished as one of falling prices. Therefore  $M'$  cannot be regarded as having been proved to be a cause of higher prices. In my paper, I purposely included the general movement from 1850 to 1896 to serve as a corrective to hasty inference in the period of 1896-1909, when prices were rising; for the same group of forces were at work in both periods.

Second, Professor Fisher (in the reprint of his chapter distributed here) seeks to establish a causal relation between the amount of money in circulation ( $M$ ) and the amount of deposits ( $M'$ ) which, in my judgment, is wholly unfounded. He has developed this in his paper in the *Royal Statistical Journal*. The error consists in supposing that a man's deposit account at any time varies with the amount of money in his possession. Rather, the deposit account varies with a man's wealth. The rich man does not carry much more money to pass from hand to hand than the man of moderate means. Monetary habits in the community require a certain level of circulation for all persons, but the deposits of an individual may soar above the common level without regard to the money he keeps in circulation. His bank deposits are rather a measure of the saleable goods he has sold, "coined into means of payment."

Third, I well recognize the high position Professor Fisher occupies in the mathematical school of Walras and others; but has he not made an error in stating the essence of the price relation in his mathematical symbols? So far as I understand him, he seems to deny the fundamental value-concept (on which there has hitherto been general agreement) that price is a ratio between goods and gold. In furtherance of that idea, he thinks that, before individual prices can be arrived at, the general price level must be ascertained. Now, in my exposition using the ratio-concept, I explained in detail how the general level of prices might be affected by causes affecting the gold side of the ratio.

Therefore, I did not neglect to account for the general level and that too without doing violence to the accepted value-concept. But the ratio-concept (which Professor Fisher seems to deny) allows the forces acting on goods also to affect the general level of prices as I have shown. In my opinion, he wrongly works from a general level of prices to particular prices; while I hold that particular prices, or actual quotations, are the bases from which all averages, or price levels, are always and inevitably computed. Moreover, in his diagrams, the level of prices he used was the one computed from individual quotations. Hence his whole reasoning on the conformity of the statistics to the terms of his equation is vitiated. Indeed the better agreement he finds—after elaborate statistical computations—between the elements and their result on prices (line P)—is due, I think, to relying on an equation which is nothing more than a statement that the whole is equal to the sum of its parts.

I regret that there is no time to discuss fully these and other points so that we may all learn something from others. There remains for me only to mention that Mr. Houston, in saying that I omitted to give the facts about gold, seems not to have heard the essential part of my paper. It was mainly taken up with the data about both the demand and supply of gold; but obviously it could not here convey all the facts for which a volume is needed.

Finally, when Professor Johnson suggests that I am wrong in stating that forces affecting the goods side of the price ratio have an influence on prices, he certainly cannot mean that conditions affecting the producing, marketing, and financing of goods have no effect on prices. How else, for instance, can we explain the rise of the prices of agricultural products? The special causes affecting them have little to do with the quantity of "money." Moreover, the term "money" itself is used so loosely and vaguely that we can come to agreement on price theories only by first agreeing upon what we mean by "money." In my paper, I have discussed the relations of goods, and their prices, to gold. But, in this country, we use gold little as a medium by which goods are exchanged. Thus the relation of the prices of goods to our media of exchange has been practically omitted. And yet the price-making process generally precedes the creation of the usual banking media of exchange by which most goods are exchanged.

IRVING FISHER: I have no desire, as has been humorously suggested by one of the speakers, to hide behind an equation, but I do find it necessary to take refuge behind my book on the "Purchasing Power of Money". So many new questions have been asked that, in the few moments at my disposal, I could not answer them all satisfactorily. I believe they have all been answered in the book referred to. For instance, a chapter has been devoted to transition periods in which it has been shown, as Professor Taussig has suggested, that during transition periods an increase in  $T$  may cause an increase in  $M'$ . The equation of exchange itself does not help us to decide which of these magnitudes is cause, and which is effect, but by means of other considerations, which are fully considered in the book, justification is given for the view I hold, that  $P$  is the one passive element of the equation.

Besides the causal relation between  $M$  and  $M'$ , there seems to be only one other causal relation. This is, that an increase in  $T$ , so far as it is a *per capita* increase, causes an increase in  $V$  and  $V'$ . For this relation there is evidence both *a priori* and statistical. It does not, however, affect the quantity theory of money.

As to the fact that the lever at the right of the fulcrum differs in meaning from that at the left—this is true, but the lever is, of course, simply used as a convenient symbolism for setting forth in one picture the statistical magnitudes involved. It does not enter into the argument any more than any other statistical diagram affects the method of the statistics plotted. Of course, the two sides of the equation must be, as mathematicians say, "homogeneous"; and this is provided for by the fact that while  $V$  and  $V'$ , represented by the levers, or arms, at the left, include a time element,  $T$ , the weight at the right, also includes a time element. That is, that while the arm at the right differs in meaning from the arm at the left by omitting the time element, the weight at the right differs from the weight at the left, on the other hand, by including a time element.